CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) A method, comprising:

generating an optical transmit signal in response to an electrical transmit signal;

coupling the optical transmit signal into a waveguide for transmission there over;

receiving an optical receive signal from the waveguide, the optical receive signal having a same communication wavelength as the optical transmit signal; and

generating an electrical receive signal in response to the received optical receive signal, wherein generating the optical transmit signal in response to the electrical transmit signal occurs simultaneously as generating the electrical receive signal in response to the received optical received signal.

2. – 7. (Cancelled)

8. (Currently Amended) The method of claim [[3]]1, further comprising adjusting a bit-rate of the electrical transmit signal and the optical transmit signal to maintain a link integrity across the optical waveguide with a remote transceiver at a maximum bit-rate.

9. (Previously Presented) The method of claim 1 wherein the optical transmit signal and the optical receive signal simultaneously propagate along the single optical waveguide in opposite directions.

10. (Original) The method of claim 9, further comprising isolating the electrical receive signal from the electrical transmit signal with an echo cancellation circuit.

11. (Original) The method of claim 9 wherein generating the optical transmit signal comprises directly modulating a diode and wherein receiving the optical receive signal comprises receiving the optical receive signal with the diode.

12. (Original) The method of claim 9 wherein generating the optical transmit signal comprises directly modulating a laser diode and wherein receiving the optical receive signal comprises receiving the optical receive signal with a P-I-N diode.

13. (Original) The method of claim 9 wherein generating the optical transmit signal comprises modulating a continuous wave beam with an electro-absorption modulator and wherein receiving the optical receive signal comprises receiving the optical receive signal with a P-I-N diode.

14. (Previously Presented) A half-duplex transceiver, comprising:

an optical semiconductor device ("OSD") to generate an optical transmit signal having a first wavelength for transmission along a communication link and to receive an optical receive signal having a second wavelength from the communication link, the OSD to generate the optical transmit signal in response to an electrical transmit signal and to generate an electrical receive signal in response to the optical receive signal, wherein the OSD includes a diode disposed within a waveguide and one of a distributed

feedback grating or distributed Bragg reflectors disposed within the waveguide on either side of the diode;

a physical media driver ("PMD") electrically coupled to the OSD, the PMD to amplify the electrical receive signal during a receive mode and to drive the OSD with the electrical transmit signal during a transmit mode; and

a data link device ("DLD") electrically coupled to the PMD to switch the PMD between the receive mode and the transmit mode.

15. (Previously Presented) The half-duplex transceiver of claim 14 wherein the waveguide comprises an integral waveguide, and wherein the OSD comprises:

the integral waveguide for optically coupling to the communication link and to guide the optical receive signal and the optical transmit signal therein; and

the diode formed within the integral waveguide to generate the optical transmit signal in response to the electrical transmit signal and to generate the electrical receive signal in response to the optical receive signal.

16. (Previously Presented) The half-duplex transceiver of claim 14 wherein the diode comprises a P-I-N diode, the P-I-N diode to be forward biased during the transmit mode and to be reverse biased during the receive mode.

17. (Cancelled)

18. (Original) The half-duplex transceiver of claim 14 wherein the PMD comprises:

a receive amplifier to amplify the electrical receive signal during the receive mode;

a signal driver to drive the OSD with the electrical transmit signal during the transmit mode; and

a switch to switchably couple the OSD to the receive amplifier during the receive mode and to switchably couple the OSD to the signal driver during the transmit mode.

19. (Original) The half-duplex transceiver of claim 14 wherein the DLD comprises:

a physical media access ("PMA") device electrically coupled to the PMD to recover a clock signal from the amplified electrical receive signal and to clock the electrical transmit signal; and

a media access controller ("MAC") electrically coupled to the PMA device and to the PMD to switch the PMD between the receive mode and the transmit mode and to buffer first data to transmit in the electrical transmit signal and to buffer second data received in the electrical receive signal.

20. (Original) The half-duplex transceiver of claim 14 wherein the first wavelength and the second wavelength are substantially equal.

21. (Original) The half-duplex transceiver of claim 14 wherein the DLD includes an adjustable bit-rate circuit ("ABRC") to adjust a bit-rate of the electrical transmit signal and the optical transmit signal during the transmit mode.

22. (Original) The half-duplex transceiver of claim 21 wherein the ABRC includes a variable voltage controlled oscillator.

23. (Previously Presented) An apparatus, comprising:

an optical semiconductor device ("OSD"), the OSD comprising:

an electro-optical conversion element to simultaneously convert an optical receive signal to an electrical receive signal and to convert an electrical transmit signal to an optical transmit signal;

a bi-directional optical port optically coupled to the electro-optical conversion element to simultaneously output the optical transmit signal and input the optical receive signal;

an electrical transmit port electrically coupled to the electro-optical conversion element to receive the electrical transmit signal; and

an electrical receive port electrically coupled to the electro-optical conversion element to output the electrical receive signal and the electrical transmit signal combined.

24. (Original) The apparatus of claim 23, further comprising a physical media device ("PMD"), the PMD comprising:

a transmit driver electrically coupled to the electrical transmit port of the OSD to drive the electro-optical conversion element with the electrical transmit signal; and

an echo cancellation circuit coupled to the electrical receive port of the OSD to isolate the electrical receive signal from the electrical transmit signal.

25. (Original) The apparatus of claim 23 wherein the electro-optical conversion element comprises:

an integral waveguide to optically couple to the bi-directional optical port and to guide the optical receive signal and the optical transmit signal therein;

a laser diode formed within the integral waveguide to generate the optical transmit signal in response to the electrical transmit signal; and

a P-I-N diode formed within the integral waveguide between the bi-directional optical port and the laser diode, the P-I-N diode positioned to receive the optical receive signal and to generate the electrical receive signal in response thereto.

26. (Original) The apparatus of claim 23 wherein the electro-optical conversion element comprises:

an integral waveguide to optically couple to the bi-directional optical port and to guide the optical receive signal and the optical transmit signal therein;

a laser diode formed within the integral waveguide to generate a constant wave optical beam along the integral waveguide;

an electro-optical absorption modulator ("EAM") formed within the integral waveguide between the bi-directional optical port and the laser diode, the EAM to modulate the constant wave optical beam in response to the electrical transmit signal; and

a P-I-N diode formed within the integral waveguide between the bi-directional optical port and the EAM, the P-I-N diode positioned to receive the optical receive signal and to generate the electrical receive signal in response thereto.

27. (Original) The apparatus of claim 23 wherein the electro-optical conversion element is coupled to convert the optical receive signal having a communication wavelength to the electrical receive signal and to convert the electrical transmit signal to the optical transmit signal having the same communication wavelength.

28. (Previously Presented) A communication system, comprising:

a first transceiver to convert an optical receive signal to an electrical receive signal and to convert an electrical transmit signal to an optical transmit signal, the optical receive signal having a same wavelength as the optical transmit signal;

a communication link optically coupled to the first transceiver to convey both the optical receive signal and the optical transmit signal, the first transceiver to launch the optical transmit signal into the communication link; and

a second transceiver optically coupled to the communication link, the second transceiver to generate the optical receive signal and to launch the optical receive signal into the communication link, the second transceiver to receive the optical transmit signal and to convert the optical transmit signal to a second electrical receive signal, wherein the first and second transceivers are configured to adjust a length of a transmit interval and to adjust a length of a receive interval to optimize data throughput across the communication link.

29. (Original) The communication system of claim 28 wherein the communication link comprises an optical fiber.

30. (Original) The communication system of claim 29 wherein the first and second transceivers are configured to launch the optical receive signal and the optical transmit signal into the optical fiber during mutually exclusive time intervals.

31. (Original) The communication system of claim 30 wherein the first and second transceivers each include an adjustable bit-rate circuit to adjust bit-rates of the optical receive signal and the optical transmit signal to maintain a link integrity across the optical fiber at a maximum bit-rate.

32. – 34. (Cancelled)

35. (Previously Presented) An apparatus, comprising:

an optical semiconductor device ("OSD"), the OSD comprising:

an integral waveguide to guide an optical receive signal and to guide an optical transmit signal therein;

a diode formed within the integral waveguide to generate the optical transmit signal in response to an electrical transmit signal and to generate an electrical receive signal in response to the optical receive signal;

one of a distributed feedback grating or distributed Bragg reflectors disposed within the integral waveguide on either side of the diode;

a bi-directional optical port optically coupled to the integral waveguide to simultaneously output the optical transmit signal and input the optical receive signal; and

a bi-directional electrical port electrically coupled to the diode to conduct the electrical transmit signal and the electrical receive signal.

36. (Original) The apparatus of claim 35, further comprising:

a transmit driver electrically coupled to drive the diode with the electrical transmit signal;

an echo cancellation circuit electrically coupled to isolate the electrical receive signal from the electrical transmit signal; and

an interface to electrically couple the bi-directional electrical port of the OSD to the transmit driver and to the echo cancellation circuit.

37. (Original) The apparatus of claim 36 wherein the echo cancellation circuit and the transmit driver are components of a physical media device ("PMD").

38. (Original) The apparatus of claim 35 wherein the diode is coupled to convert the optical receive signal having a communication wavelength to the electrical receive signal and to convert the electrical transmit signal to the optical transmit signal having the same communication wavelength.

39. (Previously Presented) A method, comprising:

generating an optical transmit signal in response to an electrical transmit signal;

coupling the optical transmit signal into a single communication link for transmission there over;

receiving an optical receive signal from the single communication link, the optical receive signal having a same communication wavelength as the optical transmit signal;

generating an electrical receive signal in response to the received optical receive signal; and

adjusting a bit-rate of the electrical transmit signal and the optical transmit signal in real-time during operation based on current conditions of the single communication link to maintain a link integrity across the single communication link with a remote transceiver at a maximum bit-rate.

40. (Previously Presented) The method of claim 1 wherein the optical transmit signal is generated during a transmit interval and wherein the optical receive signal is received during a receive interval, the transmit interval and the receive interval alternating back and forth.

41. (Previously Presented) The method of claim 40, further comprising switchably coupling the electrical receive signal to a trans-impedance amplifier during the receive interval.

42. (Previously Presented) The method of claim 41, further comprising switchably coupling a signal driver to a diode during the transmit interval, the signal driver supplying the electrical transmit signal, the diode generating the optical transmit signal during the transmit interval.

43. (Previously Presented) The method of claim 42, further comprising forward biasing the diode during the transmit interval to generate the optical transmit signal and reverse biasing the diode during the receive interval to generate the electrical receive signal in response to the received optical receive signal.

44. (Previously Presented) The method of claim 40, further comprising transitioning between the receive interval and the transmit interval to maintain a short communication latency.